What's ADL?

ADL is a macro language within the Cary WinUV software and allows to quickly realize individual application features in addition to the standard applications in the Cary WinUV package. It uses SAX-Basic as programming language, which allows specific and easy access to the functions of the photometer as well as control and integration of peripheral components. The familiar user interface with graphics, reports and data structure still remains.

Features

- extended, individual measurement procedure
- additional, individual calculations and evaluation
- specification of additional parameters
- acquisition of additional information
- control or integration of accessories and peripheral devices
- user guidance according to a work instruction
- Data exchange with other systems
- Adaptation of report and documentation

ADL projects are possible for the Cary 60, 100, 300, 4000 and 5000 models as well as the Cary Eclipse.

> **Keywords**
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> Peristaltic pump, syringe pump, membrane pump, dilutor, autosampler, sample station, valve switching, wellplate reader, Peltier thermostat, cryostat, electrochemical cell, immersion probe, online connection, process control system, synchronization, triggering, CSV export, LIMS connection

Collection of realized ADL applications

ADL-01: Total Solar Reflectances (TSR) according to ASTM G173-03 (2008)

Purpose: Determination of the TSR value for a reflectance spectrum in colorimetry.

Implementation: Readout of the data points in the selected spectrum. Calculation of the integral values for the wavelength ranges Total, UV, Vis and IR considering the weighting factors for Hemispherical Tilt Irradiation (HTI), Extraterrestrial Radiation (ETR) or Direct & Circumsolar (DCS) and output to the report.

ADL-02: Measuring and evaluating secondary standards for photometer verification

Purpose: Measuring and evaluating secondary standards to check wavelength accuracy, photometric accuracy, resolution and stray light.

Implementation: Acquisition of the information of standards to be tested (type, batch, serial no., etc.), measurement, determination of reference values and report design as a certificate.

ADL-03: Evaluation and assessment of spectra on optical bandpass, shortpass and longpass filters

Purpose: Determination, evaluation and documentation of the characteristic indices of spectra from optical bandpass, shortpass and longpass filters.
Implementation: Capturing of the general parameters, evaluation of the loaded spectrum, report of the results incl. export to CSV file, loading of the evaluation criteria from given file, perform evaluation, extend the report and CSV export, edit evaluation criteria and tolerances in a user dialog, function for loading and storage.

### ADL-04: Positioning and measuring of silica wafer

Purpose: Targeted positioning and measurement of silica waver in the sample stage.
Implementation: Acquisition of general information, waver details and instrument settings, control of stepper motors in linear or rotary drives for positioning via RS232, execution of scans, documentation and storage.

ADL-05: Sample sequences using the OD sipper and CETAC PS520 autosampler

Purpose: Automated processing of sample sequences using the OD sipper and CETAC PS520 autosampler.
Implementation: User dialog to record the general sequence information, the sipper and autosampler settings, approaching the position in the autosampler via RS232, controlling the sipper via RS232, transferring the sample into the flow-through cuvette, performing blank and sample measurement, documentation and storage of the data and information.
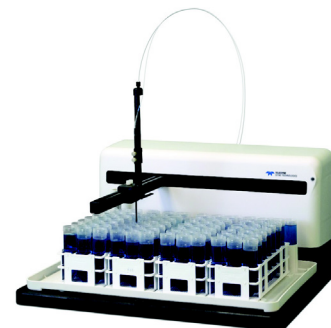
ADL-06: Determination of chlorophyll A

Purpose: Determination of chlorophyll A in an extraction sample.

Implementation: Absorbance measurement at 4 wavelengths, perform scan, calculate the content in µg/L of the extraction volume, generate report and store data.

ADL-07: Determination of amidolytic activity in pharmaceutical substances

Purpose: Determination of amidolytic activity based on kinetics measurements in tablet dissolution systems.

Implementation: Automated calculation of the best possible linear fit function within all evaluable subranges (highest correlation coefficient). The slope of the straight line represents the amidolytic activity.

ADL-08: Storage life study of beverages in PET bottles

Purpose: Determination of the CO_2 content during storage of PET beverage bottles.

Implementation: User dialog to collect the sequence information, set the schedule, call the measurement and evaluation, perform the scan, calculate the peak area in the range of wavenumbers 5050 and 4900 cm-1, evaluate the decrease of the peak area within the schedule.

ADL-09: Determination of DNA content and purity

Purpose: Determination of the concentration of the components dsDNA, ssDNA, RNA and oligo as well as their purities under consideration of the dilution factor.

Implementation: user dialog to collect sequence information, absorbance measurement for blank and sample at wavelengths 230, 260, 280, 320 and 340nm, calculation of concentration and purity, generating reports with sequence information, instrument settings, measurement results and calculated results.

ADL-10: Triggering/synchronization by communication via RS232 or USB

Purpose: Triggering / synchronization of connected peripheral devices or systems.

Implementation: Sending and receiving of defined commands via RS232 or USB for triggering of process steps or actions and monitoring of status information.

ADL-11: Time-controlled recording of measured values and concentration determination in the Concentration" module

Purpose: Combining kinetics applications with concentration determination to monitor the change in concentration of a reaction medium over time in a flow-through cuvette or at an immersion probe.

Implementation: User dialog to enter kinetics settings and sample information, start and run the application, report design and generate data file.

ADL-12: Automated measurements of anisotropy in fluorescence spectroscopy

Purpose: To perform series of measurements on anisotropy on the Cary Eclipse with polarizer using time or temperature control. For both scan and advanced reads application

Implementation: user dialog to enter control type and sequence information, start execution, report design and generate data file.

ADL-13: Drug distribution on test strips

Purpose: Measurement of the geometric drug distribution on test strips on the Cary Eclipse by positioning with the Wellplate-Reader.

Implementation: User dialog to define the geometric measurement positions and enter the sample information, start and execute the measurement procedure, control the measurement position with the Wellplate-Reader, design the report and generate the data file.

ADL-14: Determination and interpretation of bilirubin in CSF samples

Purpose: Determination and interpretation of bilirubin in cerebrospinal fluid from stroke patients according to publication by Anne Cruickshank in Annals of Clinical Biochemistry 2008.

Implementation: User dialog to enter patient and sample information, select expected peaks, define method for background compensation, perform measurement, background compensation (automated or manual), calculate criteria for interpretation, work through branches in decision tree, output decision and any notes, report design, export to LIMS system.

ADL-15: Visualization with bar chart display in radiation measurement (actinometry)

Purpose: Measuring samples in predefined cycles and displaying the absorbance values as a bar chart for better visualization in the applications „Kinetics" and „Advanced Reads".

Implementation: User dialog for defining cycle times, number of cycles, number of samples, sample information and graphic area, processing the sequence, updating the bar graph, report design, exporting the data.

ADL-16: Online connection to the process control system

Purpose: Periodical measurement of a sample in the flow cell or at the immersion probe and forwarding of the results via RS232 to a process control system.

Implementation: External triggering by pulse for auto-zero and start of recording / monitoring, read measured value after predefined time interval, transfer via RS232 to process control system, end of recording by user.

ADL-17: Processing of sample sequences for quantification of protein in solutions under GLP / GMP

Purpose: Execution of the photometric content determination for protein solutions according to the test specification of the European Pharmacopoeia under GLP / GMP conditions on the Cary 300 with Pharma Package.

Implementation: User dialog for recording information on sequence, standard for system suitability, samples, evaluation criteria, user guidance for performing measurements, calculations for system suitability, content, deviation from standard, evaluation of deviation, report design, batch files with revision status.

ADL-18: Capture barcode and CSV export of data for LIMS connection

Purpose: Capture barcode of samples for unique assignment and export measurement data and calculated results as CSV file for LIMS system.

Implementation: User guidance for capturing the barcode to the sample and necessary information, performing the measurement, calculations and exporting the required data as a CSV file to a LIMS system register.

ADL-19: Determination of Vitamin B2 content.

Purpose: Production control after the production of vitamin B2 on the Cary 60 with Pharma-Package.

Implementation: User dialog to record information about sequence and samples, blank measurements to sample or dilution, content determination, scan, detection to vitamin B2 via position of 4 peaks as well as 2 absorption ratios to measurements at 3 wavelengths, report design, data files with names according to specification.

ADL-20: Acquisition of spectra at specific points in the CV cycle of an electrochemical cell

Purpose: Spectra acquisition and documentation at points in the CV cycle when using the Spectroelectrochemical Cell Kit from GAMRY.

Implementation: tabulate desired threshold points, wait for external trigger to start measurement sequence, monitor for critical points, read out and document signal values, record and label spectra, generate report and batch file.

ADL-21: Revision of the Agilent ADL tool „WL Scans At Temp Inc".

Purpose: To redesign the Agilent ADL tool „WL Scans At Temp Inc" to allow adjustable gradients with temperature change rates.

Implementation: Enhancement and modification of user dialogs for instrument setup, temperature control, table of temperature gradients, algorithm to run a temperature gradient, report design, batch file saving and export to CSV or Excel file.

ADL-22: Scan extract and calculations with basic arithmetic operations

Purpose: Extract two single values from one scan and link them to a basic calculation type.

Implementation: User dialog to select the desired spectrum in a batch file, dialog box to select the two wavelengths and required basic calculation type, calculation and documentation in the report.

Tel. 06205 9450 0
info@duratec.de
www.duratec.de

DURATEC
Analysentechnik GmbH

Rheinauer Str. 4
68766 Hockenheim
Deutschland